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MEASUREMENT OF RESEARCH AND DEVELOPMENT IN NATIONAL ACCOUNTS

DEVELOPMENT OF A HANDBOOK ON DERIVING CAPITAL MEASURES OF
INTELLECTUAL PROPERTY PRODUCTS

Note by the Organization for Economic Co-operation and Development (OECD)¹

Summary

The 1993 System of National Accounts Revision 1 (1993 SNA Rev.1) will introduce a number of changes that impinge on intellectual property products. The need for detailed guidance on how to implement the new recommendations has been recognized by the United Nations Statistical Commission. A recently formed OECD task force will develop a handbook providing guidance on the derivation of capital measures of Research and Development (R&D) and other intellectual property products. The paper presents the structure of the handbook and reports on progress to date.

¹ Prepared by Charles Aspden (OECD) at the invitation of the UNECE secretariat.

I. INTRODUCTION

1. An Organization for Economic Co-operation and Development (OECD) task force has been formed to develop a handbook providing guidance on the derivation of capital measures (gross fixed capital formation (GFCF), consumption of fixed capital, capital services and the stock of capital) of Research and Development (R&D) and other intellectual property products. The Canberra II Group on the Measurement of Non-financial Assets has been terminated and the new task force is taking over where it left off. The handbook will be a companion to the 1993 System of National Accounts (SNA) Rev. 1, and support the changes made in the SNA affecting intellectual property products.
2. Some countries have already constructed R&D satellite accounts, but many others intend to do so in the next few years. In order to facilitate this work and promote a consistent approach it is necessary to provide guidance as quickly as possible, even if some of the guidance is preliminary. If necessary the guidance can be refined later as experience in constructing R&D satellite accounts accumulates. Therefore, the objective is to complete a first edition of the handbook before the end of 2008.
3. Eurostat has created its own task force to develop guidelines for the construction R&D satellite accounts. It is intended that the two task forces will work closely together and minimise duplication of effort.

II. BACKGROUND

4. The 1993 SNA Rev. 1 includes a number of changes that impinge on intellectual property products. First and foremost is the inclusion in the asset boundary of R&D output that meets the definition of an asset. The challenge now is to develop detailed guidelines on how this recommendation can be implemented. In addition, there are changes in the treatment of licences to use and reproduce that while probably having their greatest impact on the measurement software GFCF will affect other intellectual property products, too. The change in the recommendations concerning databases clarifies what was previously a vague definition but introduces new challenges in measurement.
5. The draft Revision 1 is also clear that the use of the prices of inputs as surrogates for output prices is a last resort and should be avoided if possible. It encourages the development of pseudo output price indices for products that are produced on own account, which obviously has major implications for many intellectual property products, including R&D.
6. One of the principal conclusions of the OECD software task force was that, at least in the short term, GFCF of software is best measured using a supply-side approach (i.e. the commodity flow approach). For many countries international trade in software is substantial, and so changes to the categories in the revised balance of payments manual (BPM6) could have an important impact on the measurement of software GFCF. These changes also impinge on the measurement of international trade in other intellectual products, including R&D.
7. Changes to industry and commodity codes will also impact on the measurement of flows, which are particularly important for measuring the supply of software.

III. DRAFT HANDBOOK - WHERE ARE WE NOW

8. The OECD Secretariat is taking responsibility for editing and publishing the handbook. A first draft of the handbook covering the text on R&D and software and databases was presented at the meeting of the OECD Working Party on National Accounts (WPNA) in October 2007. The R&D component gives guidance on those aspects of R&D measurement that the Canberra II Group resolved, but, as is described below, there are a number of issues that remain to be settled. The software component is more or less as per the report of the 2003 OECD software task force, and needs to be updated. Nevertheless, comments on any aspect of this early draft are most welcome.

A. Research and development

9. The Canberra II Group investigated the “capitalisation” of R&D for about four years. It prepared an issues paper for the Advisory Expert Group (AEG) arguing that R&D should be capitalised and expressing its confidence that the required capital measures could be made satisfactorily. This was accepted by the AEG and the recommendations were passed on to the United Nations Statistical Commission, which, at its meeting in 2007, made the following decisions:

- (a) Research and development should be treated as gross fixed capital formation in the SNA. It should be defined as in the *Frascati Manual*² (FM), namely “research and experimental development comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including the knowledge of man, culture and society and use of this stock of knowledge to devise new applications.” This definition should not be interpreted as including human capital as capital formation within the SNA.
- (b) By convention, since much R&D is carried out on own account, it should be valued at cost. In practice, the information collected in accordance with the *Frascati Manual* will provide estimates of R&D expenditure; discussion is ongoing to make adjustments to this Manual to meet the needs of the SNA more closely. It is recognised that a detailed guide to implementation will be desirable to assist implementation of this recommendation.
- (c) All R&D expenditure that is sold or is expected to bring a benefit in the future to its owner (including for the provision of public services in the case of R&D undertaken by government) is included within the asset boundary. Only R&D that brings no economic benefit discernable at the time of its completion is excluded.
- (d) With the inclusion of R&D in the asset boundary, patented entities will no longer be separately identified as such in the system, but they will be subsumed into R&D assets.

² OECD *Frascati Manual 2002: Proposed Standard Practice for Surveys on Research and Experimental Development*

10. While there is strong support by countries for adopting these recommendations in the SNA, there is also considerable concern that it is premature to do so because of technical difficulties that have yet to be overcome. In conclusion, research and development expenditure should be recognized, in principle, as part of capital formation. However, recognising the difficulties to be overcome before this objective can be reached, satellite accounts will provide a useful way of working towards solutions that give the appropriate level of confidence in the resulting measures and practical guidance on implementation will help to ensure international comparability. Therefore, the 1993 SNA, Rev.1 will describe the objective and its conceptual underpinnings, note the difficulties and provide links to work underway to overcome them and recognize that for many countries implementation will take some time. The Inter-secretariat Working Group on National Accounts (ISWGNA) will report periodically to the UN Statistical Commission (UNSC) on progress and signal when widely accepted implementation guidelines are available.

11. In its investigation of the “capitalisation” of R&D, the Canberra II Group considered a number of issues that can be summarised as follows:

- (a) Transforming survey data conducted as per the *Frascati Manual* to compile estimates of R&D GFCF;
- (b) Changes to the surveys to better meet SNA needs;
- (c) Implementation of the asset boundary in practice;
- (d) Avoiding double counting with other asset types;
- (e) Prices and volumes;
- (f) Measurement of capital stock and capital services.

12. A number of Canberra II members have constructed R&D satellite accounts and as a result the use of existing FM survey data to derive estimates of R&D GFCF is well understood. But it requires making certain assumptions about the nature of some of the flows recorded in the surveys and also some data from other sources. Accordingly, the Canberra II Group prepared a paper describing the changes needed in the FM surveys to better support SNA requirements and sent it to the chair of the National Experts on Science and technology Indicators (NESTI) in 2005.

13. With these changes it appears that FM survey data can provide reasonable estimates of expenditures on domestically-produced R&D, R&D exports, but only imports of R&D to domestic R&D performers. Also, there is evidence that the FM surveys do not pick up flows between affiliated enterprises in different countries very well. The solution seems to be twofold. First, non-R&D performers need to be surveyed to obtain estimates of their imports of R&D. Second, ways need to be found to obtain data of R&D flows between units belonging to large multinational enterprises, possibly using tailored questionnaires via existing R&D or innovation surveys.

14. The Canberra II Group discussed the issue of double counting at several of its meetings and it is hoped that the task force will quickly come to a consensus on how to deal with it.

15. The US Bureau of Economic Analysis (BEA (2007)) has devoted a good deal of effort to developing pseudo output price indices for R&D, and ways of obtaining satisfactory estimates seem to be emerging.

16. The most important parameter when using the Perpetual Inventory Method (PIM) to estimate capital stock, capital services and consumption of fixed capital is the service life of the asset. Two different approaches have been pursued to determine the service lives of R&D assets by Canberra II members. The first has been to use data relating to patents (Australian Bureau of Statistics (ABS) (2004)) and the second has been to consult experts in the field of R&D. A pilot survey undertaken by Israel (Peleg (2007)) has found that it is possible to get expectations of R&D service lives from R&D experts. While these expectations vary from industry to industry and according to the type of R&D, it is believed that they apply around the world. Hence, some other countries are encouraged to undertake similar surveys to ascertain whether this is really true.

17. Expenditure on R&D that does not satisfy the definition of an asset should not be recorded as GFCF. Aspden (2006) suggested excluding expenditures on basic research by government, higher education and non-profit organisations, but Canberra II members were divided in their views. This is an issue that needs further investigation.

B. Software and databases

18. The intention is to base the guidelines for software and databases on the report of the 2003 OECD Software Task Force, but including amendments needed to deal with the changes mentioned above and reflecting any refinements based on the experience gained since 2003.

C. Mineral exploration and evaluation

19. The ABS has drafted text for this asset category and it was presented at the meeting of the OECD WPNA in October 2007.

D. Entertainment, literary or artistic originals

20. It is intended to base the guidelines on the report of 2003 Eurostat task force. As yet there is no author.

IV. PROCESS

21. A message was sent to all OECD Member and candidate countries inviting them to participate in the task force. Eight countries responded positively: Canada, France, Germany, Israel, Korea, Netherlands, United Kingdom and United States, with a total of 16 participants. The chair is Brent Moulton of the US BEA.

22. It has been agreed that sub-groups of the task force be formed to work on particular topics as follows:

- (a) Service lives for R&D assets (Soli Peleg, Israel);
- (b) Output price indices for R&D (Dennis Fixler, US);
- (c) Identifying those R&D expenditures which should not be recorded as GFCF (Dirk van den Bergen, Netherlands);
- (d) Measuring international trade in R&D (Francisco Moris, US);

(e) Changes in standards concerning software and databases (Charles Aspden, OECD).

23. Each sub-group has a leader/convener responsible for organising the sub-group and reporting its findings and recommendations to the task force. Their names are shown in brackets, above.

24. An important goal is to have a near final draft of the handbook ready for the meeting of the OECD WPNA in October 2008. The first meeting of the task force will be on 24-25 April 2008 in Geneva. The aim is to complete as many issues as possible at this meeting and either report on progress or have topics for discussion on the other issues.

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